

## Iranian students protest Shah in U.S.

by Harold Koblin

Ten Iranian students are holding a hunger strike outside the American Consulate to protest the presence of the Shah of Iran in the United States.

The Shah is currently undergoing cancer therapy in a New

York hospital and the sit-in, sponsored by the Confederation of Iranian Students (CIS), is expected to continue today.

Yesterday morning the demonstrators were confronted by a large squad of MUC Police. The police, however, did not disturb the protesters—they were

merely on their way to a demonstration being held around the corner on the other side of Complexe Desjardins.

Ziba, a spokesperson for the group, said the demonstration is being held "to convince Montrealers to support us."

"We're protesting the Shah's presence in the U.S. We want him to be sent to Iran as soon as possible to stand trial for his crimes."

She claimed that the Shah would receive a fair trial, and denied rumours of a bloodbath under the Ayatollah's regime.

"Mispropaganda is making people think that the Khomeini government is not a peoples' government. This is not true. The present government is independent, democratic and struggling to remain so against the two superpowers."

Interviewed Wednesday afternoon, the demonstrators said they wanted to keep their protest going through the night. One demonstrator said they might have to give up the demonstration because it is illegal to sleep on the street in Montreal.

The demonstrators seemed to be more concerned about a possible rainstorm than about the MUC Police. Farzad Mazaherpour, one of the demonstrators, said, "If it rains, we'll use umbrellas."

The hunger strike is only one of a number of activities that CIS is planning to hold over the next week. Monday morning, the group will stage a demonstration outside the Palais du Justice, where twenty-three Iranian students are facing charges of disturbing the peace.

According to Law 24 of the Immigration Act, the students, if convicted, will be deported back to Iran.

## CTV refuses to give W5 transcripts

Ottawa (CUP)—CTV is refusing requests for transcripts of the controversial W5 report on international students, although it is completely satisfied with the accuracy of the programme, says CTV executive Don Cameron.

This follows an earlier statement by a representative of W5 to a National Union of Students (NUS) staff person that transcripts would be available at \$10 per copy.

The report, entitled "The Campus Giveaway," claimed foreign students are a burden on Canadian taxpayers and are crowding out Canadian students. Government officials and education experts called the programme biased, inaccurate and racist.

John Cameron, vice president of news, features, information and programming at CTV, said a lack of manpower and facilities made it impossible to distribute the transcripts. He said CTV was not trying to stop distribution of the transcripts, however.

This report was contradicted by a CTV employee who said they were told the transcript should not be released.

"When they say you can't release it, I don't question their reasoning," the employee said.

Cameron has repeatedly denied that CTV is trying to suppress copies of the script.

"There is nothing to hide here. We're not throwing them out in the streets but they are circulating," he said.

Cameron said the Canadian

Bureau for International Education (CBIE) had mailed a copy of the transcript back to CTV and this is evidence that the transcript was in public hands. The CBIE actually received its copy from a private recording of the programme.

Cameron said that if there had been only a few requests they would have been able to accommodate them but CTV could not handle the number of requests they had received.

"We are not the CBC you know. We do not have all the people to do all the paper work," he said. "If we give copies to one, we will have to give copies to them all."

NUS and the Canadian Association of University Teachers (CAUT) may ask the Canadian Radio and Television Commission (CRTC) for equal air time to refute what they say were misrepresentations in the original programme.

Cameron said CTV is already working on a follow-up programme on foreign students to be broadcast within two months.



Iranian Students protest Shah's visit to U.S. at the American Consulate in Montreal.

## Students launch campaign

by Michele Press

Dominica hurricane victims and the Committee for Due Process are to be the beneficiaries of student altruism.

Caribbean Students' associations from McGill, Macdonald, and Concordia campuses, and the Black and Third World Students' Association at Dawson College have organized a series of fundraising events for these causes.

The Committee for Due Process, a Toronto legal

defense group for victims of police brutality, will receive a percentage of the proceeds from a Hurricane Dance to be held November 3. This will help support the family of Albert Johnson.

Johnson, a Jamaican black, was shot and killed by two Toronto policemen last month. The incident sparked a series of demonstrations by Toronto blacks protesting the brutality of the Toronto police force.

The remaining funds from the dance as well as the money collected from a Caribbean luncheon, November 8, a movie, (*The World of the Caribbean*) November 9, and a raffle have been allotted to the hurricane victims.

Newly independent Caribbean nation Dominica was devastated by Hurricane David in early September and is desperately in need of aid.

Caribbean Students' Society at McGill has also contacted financial institutions for donations.

## Energy alternatives

Today's Daily looks at energy alternatives.

**Solar:** Though it's not a universal panacea it can be effectively and economically used in a variety of different situations.

**Wind:** Fifty percent of the answer to Eastern Canada's

energy needs is blowing in the wind.

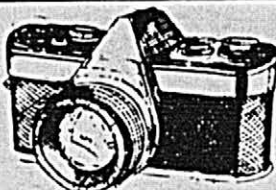
**Conservation:** The Harvard Business School's book *Energy future*, suggests conservation combined with other soft solutions is a reasonable alternative for the United States.

**Fusion:** Safer than nuclear fission, fusion is not a viable energy alternative for the near future.

**Oil:** New discoveries show there is still enough oil to keep society in the energy consuming style it has become accustomed to for 100 more years.



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5 1/2 room apartment, corner of McGregor and McTavish. Not furnished, refrigerator and stove included. Available mid-December—call 844-7083 after 6 p.m.

### 352—HELP WANTED

Student Youth Organization requires part-time office help. Must be quick typist. Call 842-6616.

Music tutors wanted for flute and violin. Mature students with one year's experience. Call Nelson or Judy at 731-1473.

### 367—CARS FOR SALE

Plymouth '1972 for sale. 58,000 miles second-hand. \$500, winter tires, call Patricio after 7:30 p.m., 843-5424.

### 372—LOST AND FOUND

Found: black and white 8-month-old cat. Near Lincoln and St. Mathieu. Call 937-7262 or 286-0121.

Lost in or about Stratheona Anatomy Building (I think). A gold chain bracelet with a small engraved plaque. It is mainly of sentimental value and I will gladly pay the finder more than it is worth. Phone or send to Elizabeth Roades, 1509 Sherbrooke St. W., no. 56, Mtl. 933-1450.

Lost: One gold-plated pen stamped "Financial group of Kuwait" bequeathed by deceased relative. High sentimental value attached. Finder will be rewarded an amount greater than pen's value. Call Jeff at 481-8028.

### 385—NOTICES

Want to Rap with a Rabbi? Call Rabbi Hausman 341-3580.

Trip to Clearwater, Florida, Jan. 5 to 12. \$289 Cdn. Price includes an air-conditioned car with unlimited mileage, return air transportation, accommodation at Ramada Inn, plus many more. Limited seats, for more info, please call 747-9220 or 747-1723.

David Wilcox - Who is David Wilcox you ask... only one of, if not the best Canadian rock and blues guitarist... having played with the likes of Leon Redbone, Ian and Sylvia, Maria Muldaur and John Paul Jones of Led Zeppelin to name must a few of the greats. Wilcox is appearing in the Union Ballroom, Friday, November 2nd at 9 p.m. Don't miss this show.

Recycle the Daily! Bring this newspaper and others to the monthly recycling depot in La Cité. The depot will be open from 9 a.m. to 2 p.m. on Saturday Nov. 3. It is located in the promenade near Direct Film. Call Vieilles Nouvelles (Old News) for more information call 279-2901 (there will be another "R Day" on Sat. December 1)

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Montreal

November 1, 1979



Dear McGill Students:

I'd like to thank you for the warm welcome I received at your campus yesterday. Sadie's had invited me to partake in the Hallowe'en festivities and I must say that things seemed to be really rolling. I'm looking forward to my return to Montreal in December and I hope you'll all be good until that time.



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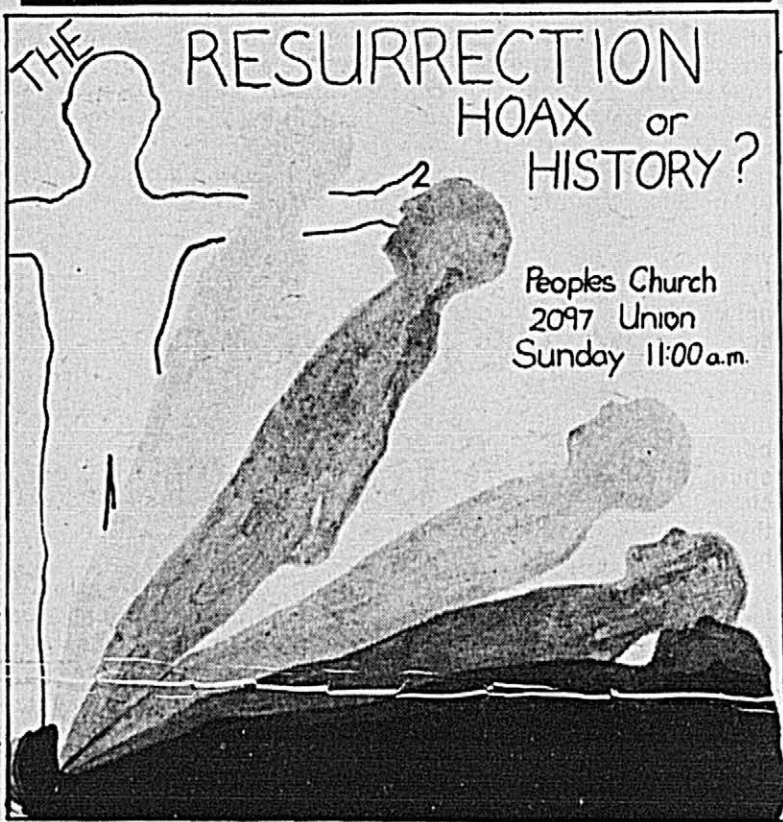
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# Here comes the Sun's energy

by Marc Tessier-Lavigne

Solar power is bound to become a major energy source in future years. In addition to being popular among conservationists, it enjoys governmental recognition and is the only "soft, renewable technology" included in the energy policies of most European and North American governments.

A 1978 Harvard Business School report concluded that solar energy along with energy conservation should be the pillar of our "energy future".

The two traditional methods of exploiting solar energy—heating, passive solar, and the direct production of electricity, photovoltaic-conversion will continue to play a leading role. New approaches which focus on the optimal use of solar energy for specific tasks are, however, developing quickly.

Passive solar is by now accepted as both economically viable and technically feasible for almost all parts of the world, not just areas receiving intense solar exposure.

Light rays are captured in solar collectors—usually metallic conductors placed behind plastic or glass sheets—across which air circulates. The heated air is then distributed around the house.

A solar energy house must be insulated so as to reduce energy waste. In addition designs usually include a back-up system (heat pump or fossil fuel furnace.) Some solar houses are only viable if accompanied by insulation.

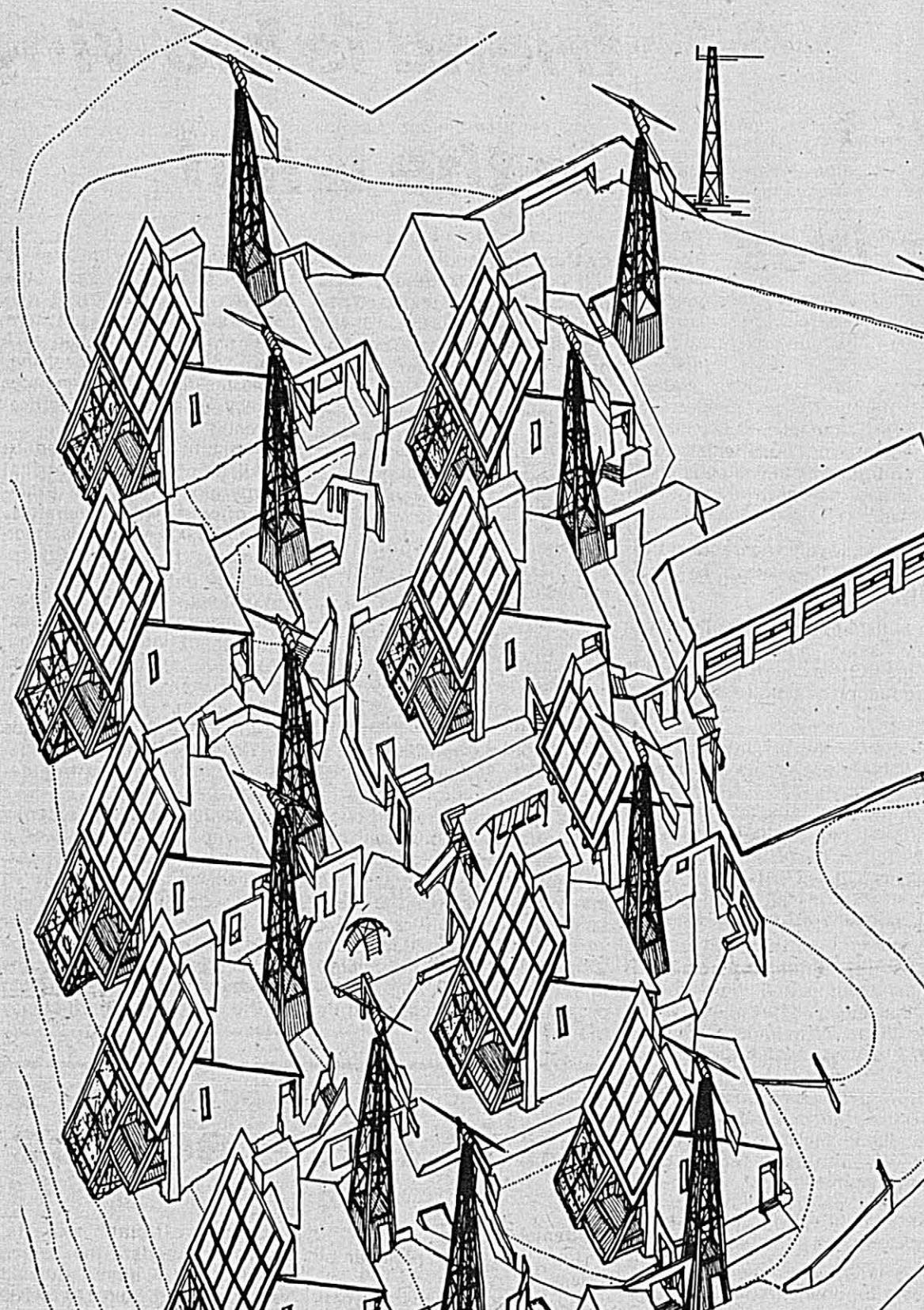
Even the most skeptical agree. Canadian figures—not the most optimistic—show that insulation can "halve" home energy consumption."

The concept of the solar home as a self-sufficient package is being tested daily in thousands of homes around the world.

Such houses can be produced at competitive prices. The Canadian 'Institute of Man and Resources' has launched a program of development of six energy-efficient house designs which can be sold on the market immediately. One design—"Consumer One"—sells at a competitive price and reduces the energy bill three fold.

Another solar home design was recently conceived of, financed, built and sold to a professor of mechanical engineering at the University of New Brunswick. He did it "just out of perverse spite, to show it can be done in a competitive market without government grants."

The concept, however, has its limitations. Although solar houses are competitive on the economic margin, it is not yet clear whether the fitting of existing houses with solar



heating is cost effective. Solar heating combined with insulation, has proven to be economical and possible but the economy of re-conversion of heating systems and the fitting of solar captors has yet to be investigated.

Solar energy is also used through its direct transformation into electricity—"photo-voltaic conversion"—in photo-voltaic cells. These cells, traditionally made of silicone although other more efficient and expensive materials exist, have typical energy conversion efficiencies of 10 to 20 per cent, and need only be placed in the sun to function.

Many energy critics discard solar cells as "unviable" because to produce the amount of energy presently consumed in North America a large portion of the continent would

have to be covered with cells. While plans exist to cover deserts in the United States with solar cells they do not recognize the potential and flexibility of photo-voltaic energy production.

Solar cells can be effectively used to serve isolated communities, or countries which have no energy infrastructure such as those in the Third World. Above all the cells can be placed on houses for individual consumption. Again, however, solar energy conversion must be envisaged in conjunction with energy planification, and not as a unique remedy to energy needs.

Another major objection to photo-voltaic conversion is its price, mainly due to the price of high-grade silicone and inefficient and costly manufac-

turing techniques. Recent developments in production methods have, however, reduced and will continue to reduce these costs even further.

A California based company announced in September of this year that it will soon produce silicone "geared to solar use" for \$5.00 per kilogram, instead of the \$60.00 now being paid for the unnecessarily pure semiconductor grade silicone currently in use.

Also, new manufacturing techniques such as solid source diffusion and inversion layer techniques promise more efficient cells at lower costs.

One hope for the future are the so-called "synthetic leaves," which exploit the fundamental energy-converting process that governs all life on

earth—photosynthesis. In green plants, solar energy is converted into electrical and then chemical energy, with energy conversion efficiencies in the range of .1 to 1 percent in optimal plants.

In 1976 Argonne National Laboratory's Joseph Katz engineered a "synthetic leaf," a chlorophyll semi-conductor device that converts solar energy directly into electricity, but with rather low efficiency.

At the University of Western Ontario a group of scientists claim they will be matching photo-voltaic efficiencies in four to five years.

Considering the low cost of organic materials involved in the production of these "leaves" and the flexibility of the product, synthetic leaves would be a major step ahead in energy conversion. In addition organic cells without many of the disadvantages of silicone cells, can be engineered to match the temperatures and degree of solar radiation that give the best performance.

Notwithstanding expected future developments, electricity from solar cells is already available and economical.

Besides heating and electric conversion, there exist a number of other ways of harnessing solar energy, in forms appropriate to specific needs. Desalination is one example—Israel and Australia already use solar energy to produce drinking water in substantial amounts.

"High-temperature" production of electricity is another method of solar energy of particular use in Third World countries, and is currently being tested in Australia. Sun rays are focused on a fluid, causing it to boil and the superheated steam then drives an alternator capable of producing electricity.

As is the case with solar cells this method is of particular use in places where no energy infrastructure exists (transmission lines, or conventional fuel distribution infrastructures). Residual heat from such devices is usually used for space heating, hot water and air-conditioning.

Manifold other devices exist, which aim to match specific uses to specific needs—solar refrigerators for tropical countries or the use of solar in certain specialized industries, where extremely high temperatures can be obtained by focusing rays. The solar reflector at Font-Romeu in France uses this method industrially to produce alloys.

Through heating, production of electricity and, above all, by direct use for specific tasks, solar energy could become the cornerstone of society in the future.



# Comment

## The politics of alternatives

by Marc Tessier-Lavigne

Today, a nation that wishes to formulate an energy policy has two currently acknowledged "paths" from which to choose. The "hard path" relies on the continued expansion of centralized technologies, whereas the "soft path" purports to use renewable energy flows.

The two policies are not, in practice, totally separable, nor technologically incompatible, though they seem to be culturally and institutionally distinct.

For the short term, the "hard path" approach calls for the use of oil, gas, coal, and nuclear fission. In the long term it expects nuclear fusion to solve the world's energy problems, though we do not foresee the production of fusion energy for another 50 years.

The "soft path" attempts to match the quality and scale of the energy source to the established need for its end-use, thereby encouraging energy conservation. Diversity, resiliency, and decentralization are the alleged characteristics of soft technologies. Proponents of the hard line advance a few tenable arguments in favor of their choice, apart from a postulated "necessity" of nuclear energy for "inevitable" future needs. What is the nature of this "necessity" and "inevitability"? Should we believe these Nuclear Cassandras?

Marc Ross, a former high energy physicist, recently pointed out to McGill's Physical Society that there is a definite ideology underlying the claim of "necessity". Governments determine future needs by extrapolation of past consumption rates. In 1973, estimates of future consumption and the oil crisis were used as justification for endorsing a wide scale nuclear program. Governments and big companies claimed, at the time, that nuclear was the only technology capable of satisfying the ever-increasing need for energy. They forgot the disastrous effect of previous reliance on a single energy source—oil.

They felt their decision was not arbitrary. For them, society's needs and means had determined its future.

It is ironical that seven years later, governments have almost halved their 1973 forecasts for energy requirements for the year 2000. Nuclear expansion has been reduced and there seems to be no real crisis. The London-based organization "Friends of the Earth" has made analyses showing that merely by a process of reorganization, of matching the form of energy to the end-use need, and using only today's proven technology we could reduce the expected energy for the year 2000 threefold, while at the same time producing expected goods and services. The 1973 "inevitable needs" were not intrinsic societal needs. They were the needs dictated by the nuclear option.

The technology we adopt will determine, to a large extent, the path society travels, and hence its future requirements and structure. If we are to have any say in the kind of society in which we want to live, we must study present-day technologies and assess the type of society they entail.

The opposition of hard and soft technologies is not just an opposition of means; it is, above all, an opposition of goals.

The soft technology path rests on one fundamental idea: that society as a whole is more akin to a living organism than to a machine. Citizens should not be cogs, but rather interacting parts of an organic whole. Delocalization of centres of power and decision does not mean any kind of regression, but rather an opportunity for man to assert himself. Growth is not an end, but a means. The choice of a soft path is a viable one; we have the technology and the creativity necessary to build this new society.

## The answer my friend is blowing in the wind

by Marc Normandin

If properly harnessed, wind power could supply up to 50 per cent of eastern Canada's energy needs, says Jack Templin, head of Low Speed Aerodynamics Laboratory.

In fact, according to estimates from NASA, 10 per cent of the United States' energy requirements could be filled by gusty breeze generators by the year 2000.

Clean, free, non-polluting and inexhaustible, the world's available wind power is estimated to be worth about \$500 million a year or 100 billion watts of power.

In Canada research into wind power as an alternate energy source has been scarce—the government has been pouring its effort and money into nuclear.

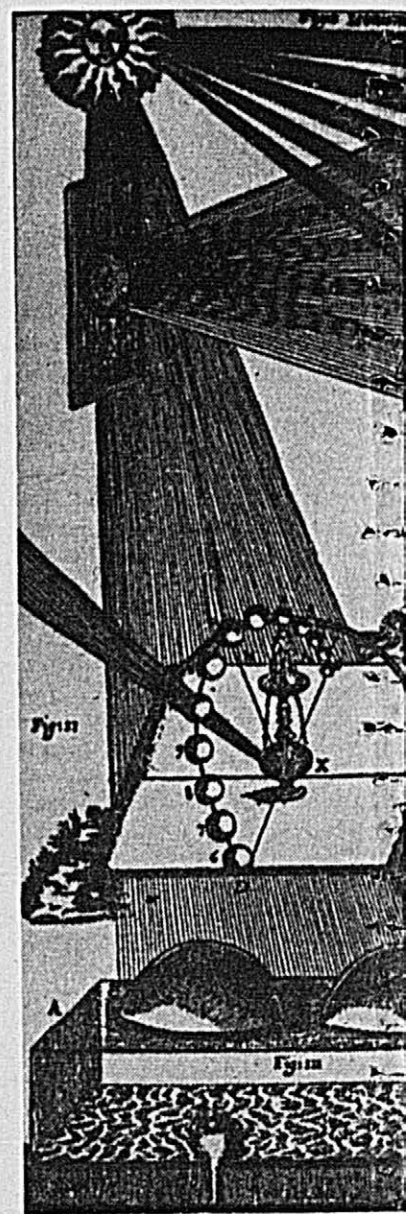
The United States, though concentrating on nuclear too, has been more willing to fund alternate sources of power. Its interest is reflected in the sharp spurt of federal funding for wind power research, up from \$200,000 in 1972 to \$12 million in 1976. Nearly 50 wind power projects are now supported by federal funds.

The wind power market is restricted to select areas near centres of heavy electrical consumption. Wind pressure turns propellers attached to a shaft which, when revolving, spins the rotor of a generator thereby creating an electrical current.

Windmills, used to produce small amounts of electrical energy since 1890, are examples of crude wind generators. Some 150,000 windmills operate across the United States, chiefly to pump water.

Wide scale wind power electrical generation is considered a major option for Denmark where coal and oil are scarce and expensive to import and water power is limited. In addition, the strongest winds in Denmark blow in winter when electrical heating demands are heaviest.

A Danish scientist recently compared the operation of a wind generator in Gedser, Denmark with that of the United States' Zion-1 Nuke. Results showed that while the nuclear facility was producing energy 63 per cent of the time, the Gedser windmill was operating at the 40 per cent efficiency level.



Zion-1's record is comparatively good for a reactor and the wind generator's poor record was mainly attributed to lack of adequate energy storage facilities. It was felt that had the storage been improved the

## Oil is not a scarce resource

by Daniel O'Lartig

No, There is not really an oil crisis.

No, It is not true that 30 years from now "oil" will have become a word of the past.

Indeed, recent discoveries have increased by 50 per cent previous figures on known oil field reserves.

Furthermore the actual price of oil now makes it profitable to exploit old wells or new regions which until now had been neglected, and left out of the official reserves estimates.

Finally the techniques used to refine tar sands have become almost competitive with those used on classical oil, and have increased tenfold the known extractable world reserves of oil.

Barnardo Grossling of the United States Geological Survey, in fact, claims that, at a price of \$20.00 a barrel (\$16.00 is the average today), 700 billion tons of classical oil (eg Arabic or Texan) are yet to be exploited.

Other official experts, operating under the same assumption, have quoted values ranging from 170 to 980 billion tons, and finally reached a consensus at 300 billion tons.

This estimate is over three times higher than the old value which left humanity with only 30 years of oil.

Even more drastic are the effects of the oil price increase on the "new" oils—above all, oil obtained from the tar sands.

Joseph Barnea, secretary for energy at the United Nations, says: "At today's oil prices, all the types of tar sands can be exploited to produce oil at competitive prices... hence most countries of the world could become producers."

In fact actual known reserves of oil contained in tar sands add up to 650 billion tons (250 of which come from Alberta). In addition, the estimated amount still to be discovered is just as much, enough to see our civilization through another century of oil consumption.

Costwise, exploitation of the tar sands compares favourably with nuclear energy. The initial investment needed to construct a power plant is three to seven times that required to produce an equivalent amount of new oil.

The time delays involved are six to eight years for the creation of five to ten nuclear plants, and seven years for a tar sand-oil complex producing the equivalent quota of energy.

This, then, is a partial explanation of the energy policy of the Carter administration, which rather than rushing ahead in a do-or-die panic toward potentially hazardous new energy sources, has given top priority to the development of the tar sands, second priority to solar energy and third to nuclear power.

Unexpected oil reserves give major energy consumers time to reflect on and ponder objectively which energy sources will serve society best once the black gold has run out.





Gedser generator would have been at least as, if not more, efficient than the nuclear reactor.

Proposed methods for storing energy include conventional batteries, giant flywheels, and the manufacturing of hydrogen for use as fuel. Proper energy storage could carry a load in calm periods and provide a steady output in the face of rapidly changing energy input. On-site energy storage would have the added benefit of eliminating energy peaks and power failures. Apart from the seasonal irregularities of wind power other disadvantages of this energy source are: the high cost of machinery due to its low production and the fact that wind turbines convert only six per cent of total energy available from wind blowing at the blades.

In Canada, areas such as the Maritimes, the Prairies and the Hudson Bay lowlands are considered potential consumers of wind energy. In new northern settlements, as the level of activity increases along that frontier, wind power may well be preferred over diesel power for electricity.

Wind energy researchers have devised a computer model that mixes power from wind generators with diesel units, using those which are cheapest to operate for providing the base load, and then as demand increases during the day, bringing into operation equipment of higher operating cost to meet the peak demand.

# Conservation with 'soft' alternatives is society's *Energy Future*

by Michel Sheppard

The Harvard Business School (HBS) reported in a book published this year that the United States can reduce its energy consumption by 30 to 40 per cent.

The book, *Energy Future*, showed an industrial economy like that of the USA could make the adjustment quickly by reassessing its energy priorities and implementing certain simple technical measures. The HBS concluded no sacrifice in the current standard of living would be necessary and that the only obstacles in the way of a more conservation-oriented society are institutional barriers.

Conservationist strategies, *Energy Future* said, should not be identified with curtailment. Rational, less wasteful, utilization of energy does not imply sacrificing essential services. It is, rather, the curtailment of unneeded excess.

More than any other technology, conservation is the most effective way of making additional energy available for the production of goods and services. At the same time it minimizes the environment degradation associated inevitably with all conventional technologies.

In discussion paper 126 of the Economic Council of Canada, David Brooks says a

serious commitment to conservation would encourage employment and be less inflationary, because the technology involved is low-capital intensive and highly labour intensive.

Barry Commoner, author of *Energy and Jobs*, an allocution given at a Canadian Labour Congress meeting in 1976, believes the bothersome triplet of energy, employment and environment can be dealt with through a comprehensive conservation effort.

According to Denis Hayes of Worldwatch Institute, conservation must be part of the energy future.

"Environmental, resource and capital constraints will combine to create eventual limits on energy use," he wrote. "It is preferable to anticipate this de facto ceiling and avoid it than to overshoot it radically and be forced back by nature."

Conservation measures can be broken down into three categories—buildings (residential-commercial sector), transportation and industry.

Energy costs can be substantially reduced by retrofitting older buildings with proper insulation - weatherstripping and double-paned windows facing south. These design details can be planned for all

new constructions and even more energy-efficient housing integrates passive solar systems such as greenhouses and equipment like heat pumps.

Arthur Acheson, an assistant professor at McGill's School of Architecture, is interested in the energy efficiency problems of housing and discussed the situation in an interview with the *Daily*.

Lower heat losses are possible with better insulation, a slower rate of air circulation in and out of the building, and a deliberate usage of the physical characteristics of the milieu, he said. For example, having lower tiers below the ground is an advantage because ground temperatures in the winter are higher than those of the surrounding air outside.

Heat loss is in a certain manner proportional to the temperature differential or gradient between two bodies or systems, he explained. Using the ground as a form of insulation reduces the gradient.

Acheson also suggested that storage rooms, stairwells, workshops and kitchens should all be on the north side of a house, protected by bare wall without openings. In these rooms heat is either not required or is produced by bodily movement. Living quarters would be on the other side and benefit from a wide expanse of windows thus receiving energy directly from the sun.

In the transportation field vehicles with lesser fuel consumption must be designed.

Automatic transmissions, radial tires, streamlining, reduced weights, better ignition and regenerative braking will all increase fuel efficiency. A rotary motor runs better and pollutes

less than the internal combustion engine.

In industry, excess heat can be captured for the sake of production, or injected into small-scale turbines whose electricity can be fed into the local power grid or then again piped as steam to the local residences and offices. This technique called cogeneration is applied in Sweden and Germany. A variant is district heating, a decentralized system whereby the base level electrical demand is satisfied through the conventional grid of the public utilities, with the rest being supplied by the recycling of industrial waste heat and the combustion of refuse-derived fuels.

The two sectors which need the largest energy inputs, material extraction and processing (e.g. pulp and paper, petrochemicals, steel, mining), would benefit the most from cogeneration, as the following example illustrates. In the United States, 1.2 million British thermal units (BTU) are needed to decompose limestone for a barrel of cement, but in the UK it can be done with 0.55 million BTU because the limestone is preheated with the waste heat from the kiln.

Agricultural wastes, forest industry byproducts and farm manure contain organic materials convertible into methane gas and biomass fuels. Refuse can be cleanly incinerated in small generating units and even sewage sludge is rich in nutrients which can replace energy-intensive petrochemical and phosphate-nitrate fertilizers. Sludge, in fact, has already served in stripmine land reclamation, where its high nutrient value permits a rapid return to cultivation.

## Fusion's iffy future

by Irwin Chalt

Nobel prize winner and Beatty memorial lecturer Richard Feynman told a McGill audience informally last Monday night that believes nuclear fusion cannot be considered a practical energy source for the near future.

"We have so many problems with fission that it's almost an insult to think we can solve our energy problem with fusion," he said.

Nuclear fusion occurs when energy is liberated by combining two light atoms to form a heavier one. In theory fusion is a near ideal source of energy since, unlike fission, it has no dangerous byproducts and, furthermore, it utilizes a fuel which can be cheaply refined from seawater.

It has been estimated that one glass of water provides as much energy as 30 gallons of gasoline. In fact, the economic feasibility of nuclear fusion

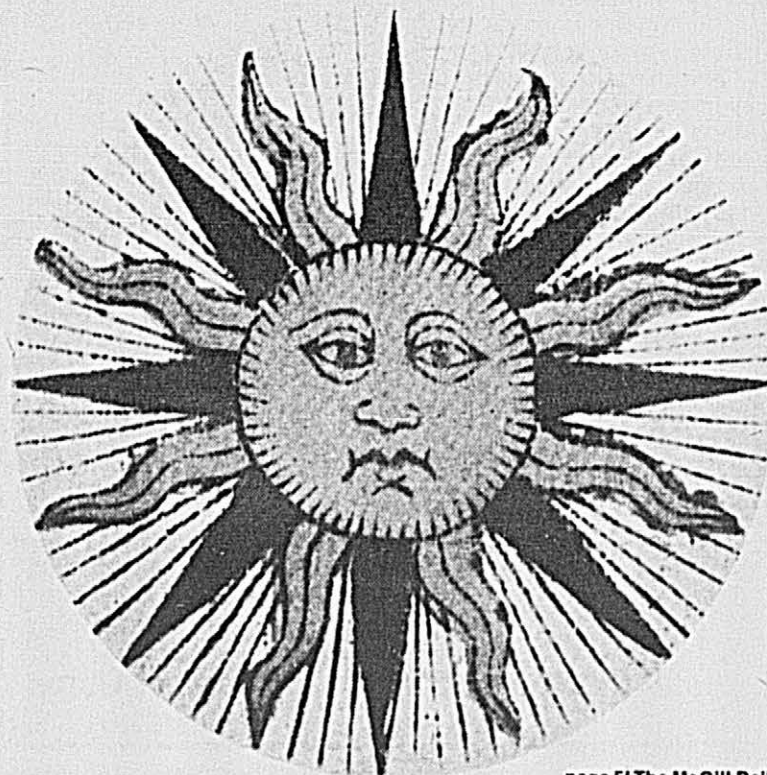
has prompted both the United States and the USSR to spend an annual \$1.1 billion on fusion research.

Scientists in both countries have yet to discover, however, how to break even—meaning how to get more energy out of the system than is put in.

In order to break even, a method of reaching temperatures as high as 100 million degrees celsius will have to be developed. (The temperature at the core of the sun is 40 million.)

Tokamak, a Russian machine, is capable of obtaining extremely high, though not high enough, temperatures by compressing fuel with magnetic field.

However, society will have to do without the fusion energy option for the short term. No one expects practical and safe fusion reactors before year 2010.









## Redsocs...

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they could fulfill their goal of going to the national finals.

When the season's play began the team fared perhaps even better than expected. Bishop's and Laval were not serious challenges. Even Concordia was given a good game as the Redsocs came from behind to tie them in the last minute of their first encounter. The second encounter with Concordia was simply a lost game. An analysis could prove nothing.

Assistant coach Zachary Briganski claimed, "We had one bad game, everyone had a bad game."

A breakdown analysis of the team could only expose facts that complemented their highly successful record. Goalkeeper Gary Strothers, with three shutouts, finished the year with a goals-against average of less than one goal per game. The back four defence was consistent the whole way through with only one collapse in the Gill-Decaire-Tipney-Grey alignment, that coming in the first Concordia match.

Up front, however, a few problems occurred. Briganski explained, "In the forwards we didn't have much depth. When



John Grey in control against Laval.

Guy (Goseph) was out and Dave (Cross) was limping, we had a couple of rookies to come in, but they didn't have much experience."

Yet the Redsoc goal scoring prowess could be called upon to produce and it did. The fact that five of the Redsocs scored three or more goals during the

season was proof of the team's ability to put the ball in the net.

All evidence in the direction of the QUAA crown and the national finals but the ultimate result left them in the cold.

"We expected to win it all", Briganski concluded, "but we came up one short".



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## Redmen gunning for Queen's crown



Richard Katz

Redmen All-Star Sam Colizza, "Pride of the Soo," shows Mike Giftopoulos why.

### McGill Sports Weekend

**Hockey:** McGill Redmen make their QUAA home debut at the McConnell Winter Stadium Saturday night at 7 p.m. The Laval Rouge et Or are the visitors.

**Squash:** 36th annual MAAA Tournament continues tonight at the MAAA (on Peel between Sherbrooke and de Maisonneuve). McGill has five of the 16 openings in the A-1 play.

**Basketball:** McGill Martlets are at the Carleton Invitational Tournament all weekend.

by Brahm Pascal

For the football fan on the arduous safari in search of the epitome of the Canadian college game, here comes your message in a bottle: Kingston, Ontario, is the football mecca tomorrow as the McGill Redmen and the Queen's Golden Gaels collide for the championship of the OQIFC East Division.

The game is a rematch of the '78 final in which the Gaels stifled the Redmen 23-1.

For the first time this season, McGill has been ranked in the college top ten, they are number eight, while the defending college bowl champ Gaels are ranked fourth.

The sudden recognition of McGill was one of the effects of the stunning defeat of Ottawa last weekend.

Other effects, however, were not as pleasing. Halfback Randy Awrey received a hit on the first play from scrimmage last week that resulted in three broken bones in his back, yet Awrey finished the game. The man from Iron Mountain will be out of action, as will defensive end Mike Kelly (torn ligaments), and of course Vic Pywowarczuk, whose jaw is broken in three places.

Slotback John McGuinness' neck injury was not as serious

as feared so he will be starting.

Clearly, it is Vic's replacement, Kevin Smith, who will be in the catbird seat tomorrow.

"Kevin has come a long way since he first came here," observed head coach Charlie Baillie. "He is much more of a leader now, a team man. In a single word, I would say 'mature'."

Smith missed three games with a dislocated shoulder this season, and he will be gazing over All-Stars Rob Ball and Jim Muller on the line; Ed Andrew at linebacker; Ted Tyczka and Jim D'Andrea in the secondary when he calls the signals. With the unplanned change in quarterbacks since the 17-6 loss to Queen's in the regular season, the Gaels defence can expect a new attack.

"We'll be showing them a different picture than we have," Baillie revealed. "The Queen's defence comes at you with eight people up front, so we're going to try to take it apart in sections."

Never one for specifics before games, Baillie was vague when it came to describing the role of the hub of the offence, Smith.

"The situation has been given a heck of a lot of thought, and I think I can say now that

Kevin's strengths are consistent with the Queen's weaknesses."

The loss at Kingston two weeks ago was an emotional one for the team, and that emotion hasn't ebbed one bit.

A special visitor to practice last night was Principal David Johnston, who gave words of encouragement to the players and special mention to defensive back Sam Colizza of Sault St. Marie, Johnston's hometown. Johnston's presence was significant to Baillie, who has been a coach at McGill for 11 years.

"Hopefully, his (Johnston's) attitude will radiate through the administration of the university," Baillie said. "I personally feel that the university administration below the principal doesn't give a damn about college football. That's just my impression of it, but maybe the principal will influence the administration, because he is a positive force."

And certainly for Baillie's and for anyone else's money, there is no better argument for college football than the McGill-Queen's game tomorrow at 1 p.m., Richardson Stadium in Kingston.

## An 'almost' Redsocs season

by Andrew Karolyi

The game meant nothing. Neither McGill nor Laval could be expected to display an aggressive, exciting brand of soccer for there was nothing to be gained. The Redsocs, however, superior to Laval in every respect, defeated the desperate Rouge et Or 3-0 at Molson Stadium on Wednesday night.

Both teams had been eliminated from post-season play and this lack of incentive lent a very slow pace to the game. The play was awkward and very uncertain, highly untypical of the kind of possession soccer the Redsocs had mastered against the other QUAA teams.

Yet, the McGill team still managed to coordinate some offence and in the first minute of play the first goal came. From a free kick set play situation, the ever-dangerous Brian Decaire, just outside the goal area, sent a perfect chip over the Laval wall to a rushing Dave Cross, who with two

defenders on his back tucked the ball into the corner of the net.

The second McGill goal at the 20 minute mark came on a freak play when Decaire rifled a 40 yard drive, which the Laval goalkeeper juggled. In an attempt to recover, he had the ball jarred loose by Cross, and Mike Kondro, on the spot, pushed it easily into the net.

The play after these goals deteriorated at a steady rate, as neither team could maintain any possession of the ball. As a result, no dangerous attacks could be mounted and a dour struggle developed in the midfield area for most of the game with only Laval having an occasional couple of shots, each of them finding the Redsoc goalposts.

In the waning minutes of the match, Decaire managed to score a final goal to put the game away on a cross from the right flank by Kondro.

Coach Gord Gow explained after the match, "The game meant nothing to the teams so

the enthusiasm dwindled in the second half. We did play well enough to win, though."

The season was over. Usually, the team would be elated with an outstanding record of 4-1-1, but emotions were far from that. The one loss to Concordia was the make or break point of the season and the Redsocs came up short.

"It's hard to say it was a satisfying season," Dave Cross aptly put it, "though we had only one loss. At the beginning we thought we had the team, there was much better team spirit than before. That one game (Concordia) was the season."

The personnel were definitely there at the beginning of the year. A good balance of rookies and veterans outfitted the squad in training camp. The talent was provided for and they synthesized into a team unit. With the promising start the players set high standards for themselves. There was very little doubt in their minds that

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Carl Helne

Redsoc striker Dave Cross.